CLAIMS

What is claimed is:

1. A direct sequence spread spectrum receiver including:

amplifying and filtering circuitry for obtaining a direct sequence spread spectrum received signal;

a spreading code signal generator circuit for generating an analog spreading code signal;

analog correlation detection circuitry for detecting correlation between said received signal and said spreading code signal to produce an analog correlation signal; and

analog-to-digital conversion circuitry for generating a digital data signal from said analog correlation signal.

2. A receiver as claimed in claim 1 wherein the spreading code generator circuit includes a digital-to-analog converter (DAC) for converting a digital spreading code sequence into a corresponding analog signal.

3. A receiver as claimed in claim 2 wherein the spreading code generator circuit includes a signal mixer arranged to mix the output from said DAC with a frequency signal to generate said analog spreading code signal.

4. A receiver as claimed in claim 3, further including two signal mixers generating orthogonal analog spreading code signals.

5. A receiver as claimed in claim 4 wherein two spreading code generator circuits are provided having respective orthogonal spreading code sequences as input.

6. A receiver as claimed in claim 1 wherein the analog correlation detection circuitry includes a mixer for mixing the received signal with the analog spreading code signal, and an analog integrator that generates said correlation signal from an output of said mixer.

7. A receiver as claimed in claim 4 wherein the analog correlation detection circuitry includes, for each of the orthogonal analog spreading code signals, a mixer for mixing the received signal with the analog spreading code signal and an analog integrator, the analog correlation detection circuitry further including an analog summing circuit that generates said correlation signal from the outputs of said mixers.

8. A receiver as claimed in claim 1 wherein the analog-to-digital conversion circuitry operates at a symbol frequency of said digital data signal.

9. A code division multiple access RAKE receiver including:

a plurality of receivers, each receiver comprising:

amplifying and filtering circuitry for obtaining a direct sequence spread spectrum received signal;

a spreading code signal generator circuit for generating an analog spreading code signal;

analog correlation detection circuitry for detecting correlation between said received signal and said spreading code signal to produce an analog correlation signal;

analog-to-digital conversion circuitry for generating a digital data signal from said analog correlation signal; and

wherein the outputs from the plurality of receivers are combined to generate a single digital data signal output.

10. A RAKE receiver as claimed in claim 9, further including time delay elements arranged to delay the passage of the analog spreading code signal to the analog correlation detection circuitry for different receivers.

11. A method for receiving and decoding a direct sequence spread spectrum signal in which a digital data signal having a baseband frequency is combined with a digital spreading code sequence and modulated for transmission at a carrier frequency, the method comprising:

amplifying and filtering a received direct sequence spread spectrum signal;

generating an analog spreading code signal corresponding to the transmission spreading code sequence;

performing analog correlation detection between the received signal and the spreading code signal to obtain a correlation signal; and

applying analog-to-digital conversion to the correlation signal to obtain a replica of the digital data signal.

12. A method as claimed in claim 11 wherein the analog spreading code signal is modulated at said carrier frequency and the analog correlation detection is performed at the carrier frequency.

13. A method as claimed in claim 11 wherein the analog spreading code signal is modulated at intermediate frequency, the method including downmixing the received direct sequence spread spectrum signal to said intermediate frequency and performing the analog correlation detection at said intermediate frequency.

14. A method as claimed in claim 11 wherein the analog-to-digital conversion of the correlation signal is performed at said baseband frequency.

15. A method as claimed in claim 11 wherein the analog spreading code signal includes orthogonal in-phase and quadrature components for correlation detection with corresponding components of the received signal in the analog domain, with resulting correlation signals combined before application of the analog-to-digital conversion.

16. A method as claimed in claim 11 wherein generating the analog spreading code signal includes digital-to-analog converting the digital spreading code sequence.

17. A method as claimed in claim 16 wherein generating the analog spreading code signal includes modulating thereof at an intermediate frequency or the carrier frequency.

18. A method as claimed in claim 16 wherein generating the analog spreading code signal includes applying a time delay thereto before use in said correlation detection.

19. A method as claimed in claim 18, further including generating a plurality of time delayed analog spreading code signals, and wherein said analog correlation detection and analog-to-digital conversion are performed separately with each spreading code signal on a form of a RAKE receiver.

20. A method as claimed in claim 11 wherein amplifying and filtering, generating, performing, and applying are implemented in a code division multiple access (CDMA) communications system.

21. A method as claimed in claim 20 wherein the CDMA communications system is implemented in a portable telecommunications device.

22. A code division multiple access (CDMA) communication system, comprising:

a receiver having:

amplification and filter circuitry to obtain a direct sequence spread spectrum received signal;

a spreading code signal generator circuit to generate an analog spreading code signal;

analog correlation detection circuitry coupled to the amplification and filter circuitry and to the spreading code signal generator circuit to detect correlation between said received signal and said spreading code signal to produce an analog correlation signal; and

analog-to-digital conversion circuitry coupled to the analog correlation detection circuitry to generate a digital data signal from said analog correlation signal.

23. The system of claim 22 wherein the receiver is implemented in a portable communications device.

24. The system of claim 22 wherein the spreading code generator circuit includes a digital-to-analog converter (DAC) to convert a digital spreading code sequence into a corresponding analog signal.

25. The system of claim 22 wherein the analog correlation detection circuitry includes a mixer to mix the received signal with the analog spreading code signal, and an analog integrator to generate said correlation signal from an output of said mixer.

26. The system of claim 22 wherein the analog-to-digital conversion circuitry is coupled to operate at a symbol frequency of said digital data signal.